ASSIGNMENT: MOVIE RENTAL SYSTEM

OBJECTIVE

Develop a simple movie rental system in Java that utilizes **classes**, **objects**, **enums**, and **ArrayLists**. This assignment will help you understand how these concepts work together in an object-oriented program.

DESCRIPTION

You will create a movie rental system that allows customers to rent and return movies. The system will keep track of movies, their availability, and customer rentals.

REQUIREMENTS

1. Create an Enum `Genre`

Define an enum `Genre` that includes the following movie genres:

- `ACTION`

- `COMEDY`

- `DRAMA`

- `HORROR`

- `SCI_FI`

- `ROMANCE`

- `DOCUMENTARY`

2. Create a Class `Movie`

Fields:

- `private String title;`

- `private Genre genre;`

- `private int releaseYear;`

- `private boolean isAvailable;` (Initialize to `true` by default)

Methods:

- **Constructor:** Initialize all fields.

- **Getters and Setters:** For each field.

- `public void rentMovie()`: Sets `isAvailable` to `false` if the movie is available; otherwise, displays a message that the movie is already rented.

- `public void returnMovie()`: Sets `isAvailable` to `true`.

- `@Override public String toString()`: Returns a string representation of the movie.

3. Create a Class `Customer`

Fields:

- `private String name;`

- `private ArrayList<Movie> rentedMovies;` (Initialize as an empty list)

Methods:

- **Constructor:** Initialize the customer's name.

- `public void rentMovie(Movie movie)`: Adds a movie to `rentedMovies` if available and marks it as rented.

- `public void returnMovie(Movie movie)`: Removes a movie from `rentedMovies` and marks it as available.

- `public void listRentedMovies()`: Prints all movies currently rented by the customer.

4. Create a Class `MovieRentalSystem`

Fields:

- `private ArrayList<Movie> movies;` (All movies in the system)

- `private ArrayList<Customer> customers;` (All registered customers)

Methods:

- **Constructor:** Initialize the movies and customers lists.

- `public void addMovie(Movie movie)`: Adds a movie to the system.

- `public void registerCustomer(Customer customer)`: Registers a new customer.

- `public Movie searchMovieByTitle(String title)`: Returns the `Movie` object that matches the title.

- `public ArrayList<Movie> searchMoviesByGenre(Genre genre)`: Returns a list of movies of a specific genre.

- `public void displayAvailableMovies()`: Prints all available movies.

5. Main Program (`Main` Class)

In the `main` method:

- Create an instance of `MovieRentalSystem`.

- Add at least **5 movies** to the system.

- Register at least **2 customers**.

- Demonstrate renting and returning movies.

- Display the list of available movies before and after renting.

ADDITIONAL INSTRUCTIONS

- Use appropriate access modifiers (`private`, `public`) for class fields and methods.

- Ensure proper encapsulation and data hiding.

- Provide meaningful variable and method names.

- Include comments in your code to explain the logic.

- Handle potential errors gracefully (e.g., renting a movie that's already rented).

- Follow Java naming conventions.

SUBMISSION

- Submit all your `.java` files in a compressed zip folder with your name and mat number.

- Ensure your code compiles and runs without errors.

- Include sample output of your program in a text file or as comments at the end of your `Main.java`.

GRADING CRITERIA

- Correct implementation of classes, objects, enums, and ArrayLists.

- Proper use of object-oriented principles.

- Code readability and comments.

- Handling of edge cases and errors.

- Successful compilation and execution of the program.

Sample Output (for reference only):

```
 1  Available movies:
 2  - Inception (SCI_FI, 2010)
 3  - The Godfather (DRAMA, 1972)
 4  - Toy Story (COMEDY, 1995)
 5  - Parasite (DRAMA, 2019)
 6  - Avengers: Endgame (ACTION, 2019)
 7
 8  John Doe is renting Inception...
 9  John Doe has rented Inception.
10
11  Available movies:
12  - The Godfather (DRAMA, 1972)
13  - Toy Story (COMEDY, 1995)
14  - Parasite (DRAMA, 2019)
15  - Avengers: Endgame (ACTION, 2019)
16
17  John Doe's rented movies:
18  - Inception (SCI_FI, 2010)
19
20  John Doe is returning Inception...
21  John Doe has returned Inception.
22
23  Available movies:
24  - Inception (SCI_FI, 2010)
25  - The Godfather (DRAMA, 1972)
26  - Toy Story (COMEDY, 1995)
27  - Parasite (DRAMA, 2019)
28  - Avengers: Endgame (ACTION, 2019)
```

Good luck!